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Current Status and Future Trends

Kentucky's Oral Health Poses Challenges

By Michael T. Childress and Michal Smith-Mello

The oral health of our citizens is important for several reasons. First, it is important as a quality-of-life issue; healthy teeth and gums can translate into a better appearance, higher self-esteem, and more self-confidence, which are key to a better quality of life. Second, missing and decayed teeth or diseased gums can make it difficult to find employment and perform well on the job, adversely affecting the pocketbooks of individuals and families as well as the state's capacity to realize economic development and increase prosperity. Third, and perhaps most important, missing teeth, inflamed gums, and cavities often make it difficult to eat a balanced diet, and increasingly research links poor oral health to illness, chronic disease, and even early mortality. Though the proverbial chicken-or-the-egg question has yet to be definitively answered, the connection is clear: poor oral health routinely coexists with heart disease, cancer, diabetes, and other illnesses. Behavioral factors such as smoking and poor diets have clearly established *causal links* to poor oral health. While real public health gains have been made in oral health here, Kentucky's overall status can best be termed as below average.

Nationally, Kentucky had the nation's highest percentage of edentate persons, those who have lost all their natural teeth due to tooth decay or gum disease,¹ among working-age adults (age 18 to 64)² in 2004; the second highest percentage among older adults (age 65 and older); and, as shown in Table 1, the second highest percentage among adults aged 18 and older.³ Kentucky ranks 8th for adults who have lost at least one permanent tooth due to tooth decay or gum disease and 14th for adults who have lost 6 or more teeth.⁴ On the brighter side, the percentage of Kentucky adults who have visited a dentist or dental clinic within the past 12 months, about 70 percent, is at the national average.⁵

While dental health has improved markedly here as water fluoridation, the nation's second highest rate,⁶ has helped reduce cavities and extractions, the findings of a 2001 state survey of children suggest that a high percentage of even very young children in Kentucky may be in pain every day, a circumstance that could affect overall health as well as the capacity to learn. Among other things, the survey found disturbingly high levels of cavities among two- to four-year-olds (47 percent), and visible, untreated tooth decay

among 29 percent of third and sixth graders.⁷ As research unfolds, we may find that these conditions are precursors to serious illness and disease.

TABLE 1
Comparison of Oral Health Indicators,
Kentucky and the U.S., 2004

Adults, 18 and Older	US (%)	KY (%)	KY (rank)
Missing at least one permanent tooth	45	50	8
Missing 6 or more teeth, but not all	11	12	14
Missing all teeth	6	13	2
Visited dentist in last 12 months	69	70	24
Working Age, 18 to 64			
Missing at least one permanent tooth	39	45	7
Missing 6 or more teeth, but not all	8	10	7
Missing all teeth	3	9	1
Visited dentist in last 12 months	70	72	19

Source: KLTPRC analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2004

The Oral Health, Whole-Body Health Link

A growing body of research confirms an association between poor oral health and a number of poor health outcomes. From preterm births⁸ to recent evidence from Harvard researchers of a dramatically higher incidence of deadly pancreatic cancer among men with periodontal (gum) disease,⁹ the associations between poor oral health and disease or chronic illness are extensive and well documented. In one large-scale study, markers of inflammation in the mouth were linked to coronary heart disease in both men and women.¹⁰ Associations have also been found between periodontal disease and the incidence of heart disease and stroke,¹¹ and tooth loss has been linked to heart disease.¹² Nevertheless, the American Heart Association cautions as would most researchers that "no substantial evidence" yet shows that oral bacteria *causes* heart disease or *causes or worsens* cardiovascular events. As AHA President Augustus O. Grant observes, people who are poor, under- or uninsured, or simply have poor health habits also tend to have poor dental health.¹³

Whether poor oral health causes or contributes to poor health outcomes, the web of associations appears strong in Kentucky where poor oral health coexists with high rates of chronic disease. In 2000, the American Heart Association ranked the mortality rate for cardiovascular disease (CVD) in Kentucky among the worst in the nation at 48th; 73 of Kentucky counties had CVD mortality

rates higher than the national average at the time.¹⁴ More recently, a 2005 survey conducted for the Centers for Disease Control and Prevention found that Kentucky ranked behind only West Virginia in the prevalence of heart disease, the percentage of the population who are either heart attack survivors or have angina (chest pain)/coronary heart disease.¹⁵

Not coincidentally, the state also led the nation in smoking rates at 29 percent of the population in 2004.¹⁶ Smoking, observes Dr. James Cecil, who leads Kentucky's Oral Health Program for the Department of Public Health, prevents healing in the mouth, increasing the likelihood of periodontal disease and any disease it may cause or exacerbate. Further, diabetes and poor oral health often coexist because diabetes also retards the healing process. Because obesity is linked to diabetes, the sixth leading cause of death in the United States, the relatively high portion of Kentuckians who report being overweight (62.5 percent) and obese (24.4 percent) may be indicative of high rates of poor oral health and, possibly, other diseases and illnesses.¹⁷

Income, Costs Discourage Care

While dental care exacts high out-of-pocket costs at all income levels, that share is clearly more burdensome for lower-income families and households. National data show that the uninsured in Kentucky and the state's disproportionately poor older population likely face significant economic disadvantage in their ability to afford dental care. In 2004, the uninsured shouldered 72.3 percent of the cost of dental care compared with 39.9 percent for those with any private coverage, and 24.6 percent for those with public coverage only. Older individuals, specifically those aged 45 to 64 and 65 and older, also had higher cost burdens, 47 percent and 68 percent, respectively, compared with an average of 39.9 percent for all individuals under age 65. Among Medicare recipients, those with no supplemental coverage paid 92.3 percent of dental costs out of pocket, compared with 63.3 percent for those with some private coverage, and 33.6 percent for those with public coverage. Likewise, those who report fair or poor health status assume higher cost burdens.¹⁸ Consequently, Kentucky's relative poverty, particularly the disproportionate poverty of its older citizens, and its generally poor health status are likely strong contributors to the state's poor oral health profile.

In effect, higher out-of-pocket costs for health care discourage people of all ages from seeking care due to the cost.¹⁹ Lagging incomes may discourage Kentuckians more than many. A 2005 survey for the Kentucky Health Insurance Study found that 30 percent of working-age Kentuckians (18 to 64) had a dental problem in the past year but did not see a dentist because of the cost. Further, 20 percent of respondents reported that either their spouse or their children had not gotten dental care when they needed it due to the cost. Though about 56 percent of Kentuckians reported having some type of dental insurance in 2005, about 20 percent of the *insured* reported not seeking care for a dental problem due to cost.²⁰ Thus, lower incomes, high cost burdens for care, and a large population of people with no dental insurance likely discourage many from seeking dental care they need.

Trends Suggest Oral Health Likely to Improve

While national rankings form a discouraging picture, indicators of oral health among Kentucky adults generally improved between 1996 and 2004.²¹ We examine two factors from the CDC's

2004 Behavioral Risk Factor Surveillance System Survey, whether one is at risk for permanent tooth extraction²² and whether one has visited a dentist or dental clinic in the last 12 months, and find an across-the-board improvement for virtually all social, economic, and demographic groups (see Table 2). Among the total population, the percentage at risk for permanent tooth extraction decreased from 63 to 50 percent while the percentage who visited a dentist in the prior year increased from 62 to 70 percent.

TABLE 2
Indicators of Oral Health, Kentucky, 1996 and 2004
(Percentage of Adults, Age 18 and Older)

	At Least One Permanent Tooth Removed Due to Decay or Disease		Visited a Dentist Within the Past 12 Months	
	1996	2004	1996	2004
Total Population	63	50	62	70
Income				
Less than \$15,000	77	70	36	50
\$15,000 to \$24,999	68	64	52	55
\$25,000 to \$34,999	67	56	63	70
\$35,000 to \$49,999	52	49	73	75
\$50,000 and Over	54	31	82	86
Education				
Less than HS	85	81	36	42
HS Diploma	68	58	64	69
Some College	54	41	70	78
College Graduate	40	26	78	81
Race				
White (non-Hispanic)	64	51	61	70
Black (non-Hispanic)	64	43	69	67
Residence				
Non-Metro	58	57	66	67
Metro	56	42	67	73
Age				
18 to 24	26	15	77	82
25 to 34	38	30	63	73
35 to 44	62	41	72	73
45 to 54	77	63	60	70
55 to 64	87	75	57	65
65 and Older	90	80	41	57
Gender				
Female	64	52	62	71
Male	63	48	60	68

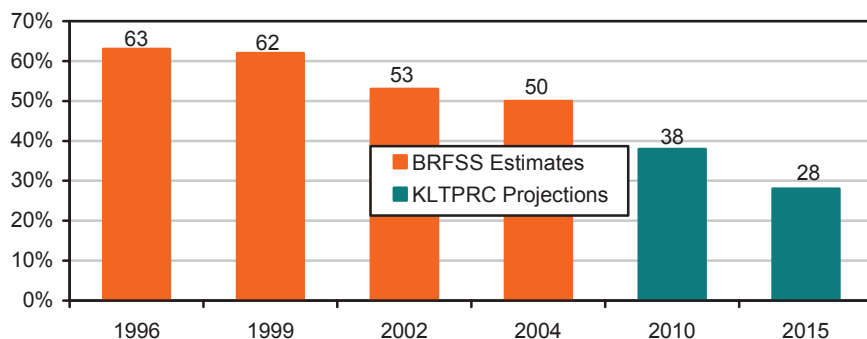
Source: KLTPrC analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 1996 and 2004

We project Kentucky's percentages for being at risk for permanent tooth extraction and annual dental visits to 2015 using a statistical model derived from CDC Behavioral Risk Factor Surveillance System (BRFSS) data. Using logistic regression, we estimate the underlying relationships between oral health and socioeconomic factors, like age, education, income, race, and gender.²³ If current trends continue without significant changes in individual behavior, medical technology, or the insurance and cost environment, then the percentage of Kentucky's adult population at risk for permanent tooth extraction could decline to 28 percent by 2015 (see Figure 1) while the percentage making an annual dental visit could increase to 78 percent (Figure 2).

Caveats to Our Analysis

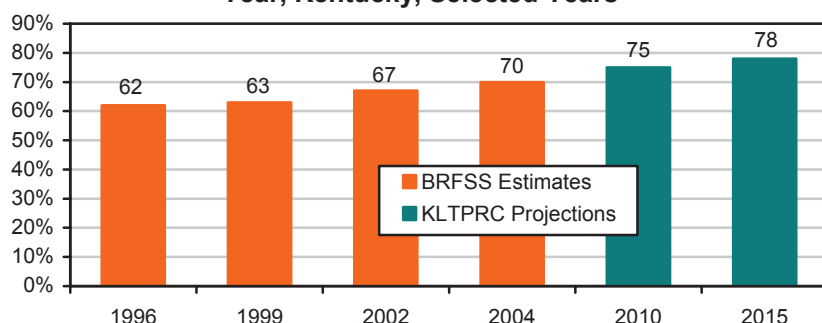
While our analysis indicates that Kentucky's oral health picture should brighten, it is not without caveats. First, the use of dental services could decline if the dental insurance market changes in ways similar to the health insurance market, with patients assum-

FIGURE 1
Percent of Adults, Aged 18 and Older, with at Least One Permanent Tooth Removed Due to Tooth Decay or Gum Disease, Kentucky, Selected Years



Source: Behavioral Risk Factor Surveillance System and Estimates by the Kentucky Long-Term Policy Research Center

FIGURE 2
Percent of Adult Population, Aged 18 and Older, Who Visited a Dentist or Dental Clinic in the Past Year, Kentucky, Selected Years



Source: Behavioral Risk Factor Surveillance System and Estimates by the Kentucky Long-Term Policy Research Center

ing even higher out-of-pocket costs. Recent trends (1996-2003) in health insurance show that greater cost burdens are being shifted to families and individuals. In 1996, about 15.8 percent of the population had total cost burdens, including premiums, coinsurance, and copayments, that exceeded 10 percent of family income while another 5.5 percent had burdens exceeding 20 percent of income; by 2003, these populations rose to 19.2 percent and 7.3 percent, respectively.²⁴ The adverse effects of higher out-of-pocket costs were disproportionately felt by the poor, people with serious illness, citizens aged 55 to 64 years, and those with nongroup health insurance which typically exacts higher coinsurance costs.²⁵

Cost disparities are less evident with dental care which typically commands high out-of-pocket costs at all income levels. Nationally, persons who had a dental expenditure in 2004 paid 48 percent of the cost out of pocket compared to 43 percent paid by private insurance and 4.7 by public insurance (4.2 percent, Medicaid; 0.5 Medicare).²⁶ In 2003, these out-of-pocket costs were two and a half times the rate paid for overall health expenditures.²⁷ On average nationally, only vision care and prescription drugs command higher out-of-pocket shares of the cost, with people

at all spending levels shouldering relatively high shares of the average cost of dental care.²⁸ However, those in the top 5 to 10 percent of total dental care spending, which reflects use as well as need, paid 52 percent of the cost on average compared with 39 percent for those in the bottom 80 percent.²⁹ While projections by the U.S. Department of Health and Human Services show no appreciable change from 1996 to 2008 in the percentage of out-of-pocket expenses for dental services (see Figure 3),³⁰ any one of a number of trends or shifts could change this trajectory.

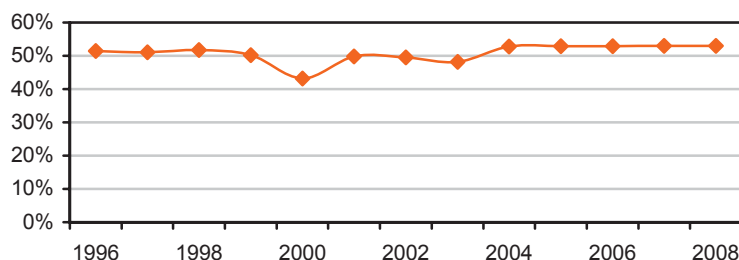
Second, just as insurance cost burdens may shift, the cost of dental care could change, which would in turn affect the number of dental visits. Per capita dental expenditures are expected to increase along their current trajectory at least until 2008 (see Figure 4),³¹ a growth rate that is outpacing income gains. From 1996 to 2003, per capita dental expenditures increased 44 percent while per capita personal income increased 30 percent.³²

Third, the trend line of improving dental health may also be affected by the supply of dentists in some regions of the state. Nationally, the American Dental Association has projected a 12 percent decline in the dentist-to-population ratio from 2001 to 2015.³³ Statewide in 2006, Kentucky had around 5.6 dentists per 10,000 population³⁴ compared to 5.4 nationally,³⁵ but the vast majority of Kentucky's counties have fewer than 4 dentists per 10,000 people (see map on page 4).³⁶ Moreover, based on our analysis of data from the Kentucky Board of Dentistry, dentists in these "underserved" areas tend to be, on average, slightly older. The average age of dentists in counties with a below-average number

of dentists is 50.1 years, compared to the statewide average of 47.9 years. Consequently, should there be a future shortage of dentists due to an aging workforce, it will likely be felt initially in those areas that can least afford it.

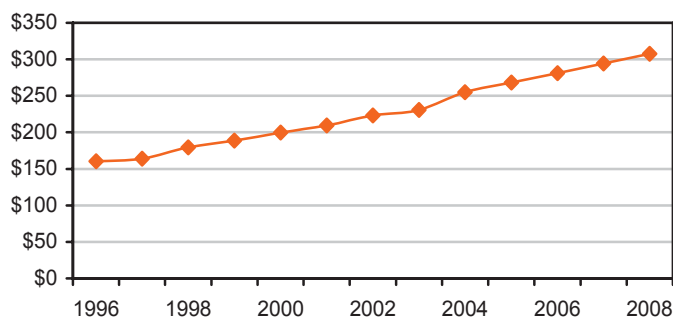
Whether newly minted dentists choose to remain in Kentucky to practice and how they practice dentistry are other matters. Accord-

FIGURE 3
Percent of U.S. Expenses for Dental Services Paid for Out of Pocket, 1996 to 2003, Projected 2004 to 2008



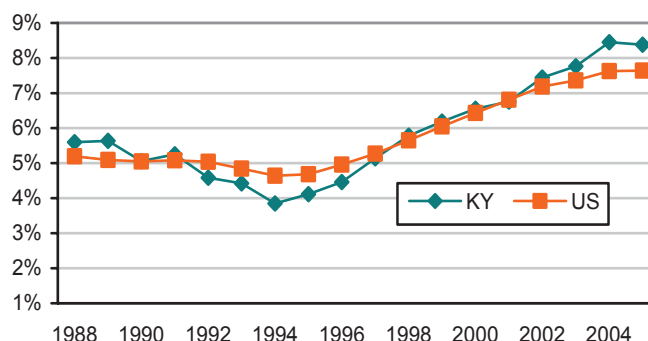
Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey

FIGURE 4
U.S. Per Capita Dental Expenditures,
1996 to 2003, Projected 2004 to 2008



Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey

FIGURE 5
Percentage of Adult Population Diagnosed
with Diabetes, Kentucky and the U.S., 1998-2005



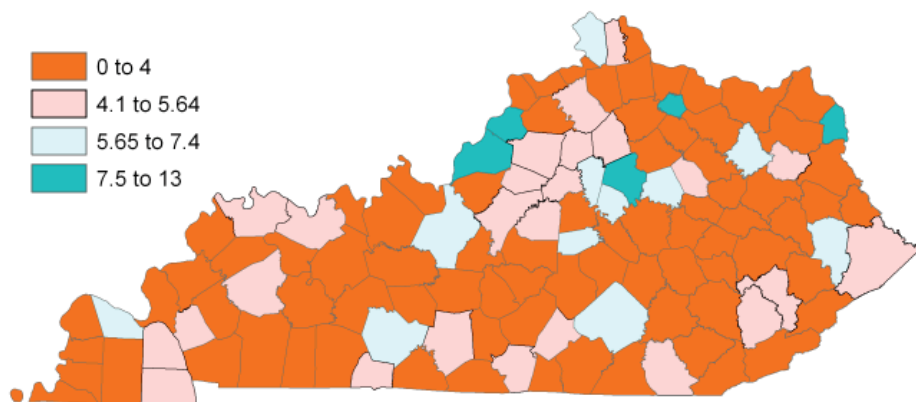
Source: KLTPRC analysis of BRFSS data, various years.

ing to Dr. Cecil, who administers the state's Oral Health Program, out of 130 graduates of Kentucky's dental schools last year, just 30 stayed in Kentucky. The makeup of future dental practices, which have become increasingly focused on high-profit cosmetic dentistry, will also affect the availability of general dental care.

Fourth, since Medicare only provides dental care if it is related to a covered (nondental) medical condition, access to dental care could diminish as the population gets older. The Kentucky State Data Center projects that Kentucky's population age 65 and older will increase from 12.4 percent in 2005 to 14.4 percent by 2015 (and eventually to just over 20 percent by 2030).³⁷

Fifth, given the linkages between smoking, obesity, diabetes, and oral health, any improvements in the overall health of our population will likely affect oral health in a positive way. Unfortunately, the smoking, obesity, and diabetes trends are not moving in a favorable direction (see Figure 5).³⁸ As Dr. Cecil notes, "It is difficult to control blood sugar levels in the presence of oral infections (periodontal diseases and periapical diseases) and the obverse has been shown as well that oral infections are not amenable to treatment in the uncontrolled diabetic."³⁹ Nonetheless, the future course of these trends could change as governments, businesses, and individuals increasingly recognize the cost implications of poor health outcomes.

Number of Licensed Dentists, Kentucky, 2006
per 10,000 population



Source: KLTPRC analysis of data from the Kentucky Board of Dentistry Mapping by COT


Improving Oral Health in Kentucky

While the state's Oral Health Program has adopted a multipronged approach that successfully reaches thousands of people throughout the state, much more will be needed to achieve real gains in oral health. The goal of improving oral health is clearly intertwined with the state's leading health goals: reducing smoking and obesity rates. Indeed, a public health campaign that sensitizes providers from the dental and medical professions to the interrelated nature of infection and disease of the mouth and body could heighten detection and improve treatment.

At the same time, Dr. Cecil emphasizes the need for a comprehensive dental health safety net to provide services to those who cannot otherwise afford them. At present, the state major safety net programs—the universities of Kentucky (UK) and Louisville dental schools, the UK Rural Health Center in Hazard, St. Clare Medical Center in Morehead, and Trover Clinic in Madisonville—are far flung. Some Federally Qualified Health Centers (FQHCs) have dental capability, but most do not. Dr. Cecil envisions enhancing the capacity of both community health centers and FQHCs and ensuring uniform local health department dental services.

The dearth of Kentucky's practicing dentists who participate in the Medicaid program also makes dental care difficult to access for the poor who qualify for coverage. Reimbursement rates that still lag the going market in spite of a recent increase are believed to be the reason why fewer than a fourth of the state's dentists participate in the program.⁴⁰ Moreover, while Kentucky's income-eligible population, even single adults, can access basic emergency services through the Medicaid program, awareness of the option may be low. Effective outreach programs could alleviate suffering, increase productivity, and prevent more tooth loss. But the Medicaid program's effectiveness ultimately rests with the accessibility of services, which will require the participation of more dentists, and, most agree, new investment in the program.

Creative incentives that will help ensure the replenishment of a comprehensive and accessible oral health care workforce will likely be

needed if gaps in care are to be avoided. From loan forgiveness in exchange for practice in an underserved area or for a public health clinic, to the training and use of paraprofessionals to identify and treat basic dental problems, new thinking will be needed to substantially improve Kentucky's oral health. Moreover, given the social and economic consequences of missing teeth, creative thinking around the issue of making dentures more affordable will be needed to help many Kentuckians become healthier, more productive members of society. While it may require significant public investment, improved oral health may reduce public costs over the long run as significant social, economic, and health benefits are likely to be realized. 

Notes

¹ The BRFSS survey question is: *How many of your permanent teeth have been removed because of tooth decay or gum disease? Do not include teeth lost for other reasons, such as injury or orthodontics. [Include teeth lost due to "infection."]*

² Centers for Disease Control and Prevention (CDC), *Behavioral Risk Factor Surveillance System Survey Data, 2004*, 5 Feb. 2007 <<http://apps.nccd.cdc.gov/brfss/list.asp?cat=OH&yr=2004&qkey=6606&state=UB>>.

³ Kentucky Long-Term Policy Research Center (KLTPRC) calculations from 2004 Behavioral Risk Factor Surveillance System (BRFSS) data.

⁴ KLTPRC, BRFSS.

⁵ The BRFSS survey question is: *How long has it been since you last visited a dentist or a dental clinic for any reason?* The 70 percent represents those who answered "Within the past year (< 12 months ago)."

⁶ Jim Cecil, "Kentucky is Number 1 in 'Toothlessness,'" *Kentucky Epidemiologic Notes and Reports*, May 2004.

⁷ Cecil, "An Overview of Selected Kentucky Oral Health Issues," *Kentucky Department for Public Health, Oral Health Program*, 26 Jan. 2004.

⁸ Robert L. Goldenberg, J.C. Hauth, and W.W. Andrews, "Intrauterine Infection and Preterm Delivery," *New England Journal of Medicine* 342 (2000): 1500-7.

⁹ Dominique S. Michaud, Kaumudi Joshipura, Edward Giovannucci, Charles S. Fuchs, "A Prospective Study of Periodontal Disease and Pancreatic Cancer in U.S. Male Health Professionals," *Journal of the National Cancer Institute* 99 (2007): 1-5.

¹⁰ Jennifer K. Pai et al., "Inflammatory Markers and the Risk of Coronary Heart Disease in Men and Women," *The New England Journal of Medicine* 351.25 (2004): 3599-2610.

¹¹ See, for example, T. Wu et al., "Periodontal Disease and Risk of Cerebrovascular Disease: the First National Health and Nutrition Examination Survey and Its Follow-up Study," *Archives of Internal Medicine* 160.18 (2000): 2749-55.

¹² See, for example, H.C. Hung et al., "The Association between Tooth Loss and Coronary Heart Disease in Men and Women," *Journal of Public Health Dentistry* 64.4 (2004): 209-15.

¹³ American Heart Association, "Poor Oral Health Associated with Coronary Heart Disease," *Journal Report*, 17 Feb. 2004, 29 Nov. 2006 <<http://www.americanheart.org/presenter.jhtml?identifier=3019173>>.

¹⁴ National Center for Health Statistics, CDC, "Fast Stats A to Z," 6 Oct. 2006, 29 Nov. 2006 <http://www.cdc.gov/nchs/fastats/map_page.htm>.

¹⁵ CDC, "Prevalence of Heart Disease—United States, 2005," *Morbidity and Mortality Weekly Report* U.S. Department of Health and Human Services 16 Feb. 2007, 19 Feb. 2007 <www.cdc.gov/mmwr/preview/mmwrhtml/mm5606a2.htm>.

¹⁶ CDC, "State-Specific Prevalence of Cigarette Smoking and Quitting Among Adults—United States, 2004," *Morbidity and Mortality Weekly Report* U.S. Department of Health and Human Services 11 Nov. 2005, 19 Feb. 2007 <www.cdc.gov/mmwr/prview/mmwrhtml/mm5444a3.htm>.

¹⁷ Kentucky Department for Public Health, *Kentucky Behavioral Risk Factor Surveillance System, 2002 Report* (Frankfort: Cabinet for Health and Family Services, Aug. 2004).

¹⁸ Medical Expenditure Panel Survey (MEPS), "Dental Services—Median and Mean Expenses per Person with Expense and Distribution of Expenses by Source of Payment: United States, 2004, General Dental Visits Only," *Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services*, 2007, 15 Feb. 2007 <www.meps.ahrq.gov>.

¹⁹ Jessica S. Banthin and Didem M. Bernard, "Changes in Financial Burdens for Health Care: National Estimates for the Population Younger than 65 Years, 1996 to 2003," *Journal of the American Medical Association* (JAMA) 296.22 (2006): 2712-2718.

²⁰ These survey results are from the Kentucky Health Insurance Research Project, a joint effort between the Center, the University of Kentucky Center for Rural

Health, and the University of Louisville. The data presented here are from a 2005 telephone survey conducted by the University of Kentucky Survey Research Center between May 27 and September 12. Households were selected using random-digit dialing, which gives each telephone line in Kentucky an equal probability of being called. A total of 2,068 surveys were completed for a response rate of 38.3%. The margin of error is approximately $\pm 2.16\%$ at the 95% confidence level.

²¹ There is a well-documented national trend of improving oral health over the last few decades. Refer to Stephen A. Eklund, et al., "Trends in Dental Care Among Insured Americans: 1980 to 1995," *The Journal of the American Dental Association* 128 (1997): 171-8.

²² An individual is considered "at risk" if at least one permanent tooth has been removed because of decay or disease (RMVTEETH=1 or 2 or 3, where 1 equals "1 to 5;" 2 equals "6 or more, but not all;" and 3 equals "all").

²³ Refer to the technical appendix for information about the models <www.kltprc.net/foresight/no50techinfo.pdf>.

²⁴ Banthin and Bernard.

²⁵ Banthin and Bernard.

²⁶ MEPS, "Dental Services ... 2004."

²⁷ John P. Sommers, "Dental Expenditures in the 10 Largest States, 2003," *Statistical Brief # 112*, Medical Expenditure Panel Survey, Agency for Healthcare Research and Quality, Jan. 2006.

²⁸ Kaiser Family Foundation, "Distribution of Out-of-Pocket Spending for Health Care Services, *Snapshots: Health Care Costs* May 2006, 15 Nov. 2006 <www.kff.org/insurance/snapshots/chcm050206oth.cfm>.

²⁹ Kaiser.

³⁰ MEPS, "Dental Services ... 2004."

³¹ MEPS, "Dental Services ... 2004."

³² KLTPRC analysis of MEPS and Census data.

³³ Tryfon Beazoglou et al., "The dental work force in Wisconsin: Ten-year projections," *The Journal of the American Dental Association* 133 (2002): 1097-1104 <<http://jada.ada.org/cgi/content/full/133/8/1097>>.

³⁴ We derived this ratio from data on practicing dentists who are licensed in Kentucky. The data is collected by the Kentucky Board of Dentistry. Lisa A. Turner, Kentucky Board of Dentistry, e-mail, 25 Jan. 2007.

³⁵ Karen Fox, "Forum looks at increasing diversity in dental profession," *ADA News*, 26 May 2006, 12 Feb. 2007 <<http://www.ada.org/prof/resources/pubs/adanews/adanewsarticle.asp?articleid=1928>>.

³⁶ Of Kentucky's 120 counties, 78 have fewer than 4 dentists per 10,000 population. According to the American Dental Association Health Policy Resource Center, the states with the highest dentist-to-population ratios have about 7.4 dentists per 10,000 population, while those with the lowest ratios have 3.5 to 4.0 per 10,000 population. We use these ratios to illustrate the distribution of dentists in Kentucky as a point of comparison (i.e., 0 to 4, 4.1 to the state average of 5.64, 5.65 to 7.4, and 7.5 and above). See Fox, "Forum looks at increasing diversity in dental profession," *ADA News*. The Kentucky data from the Kentucky Board of Dentistry indicate the dentist's zip code, which could be either their residence or their practice location (i.e., office).

³⁷ Kentucky State Data Center, 23 Feb. 2007 <http://ksdc.louisville.edu/kpr/pro/hmk2004_detailedtables_toc.xls>.

³⁸ We estimated future obesity and smoking rates in previously published work. See Michael T. Childress, "Future Obesity and Smoking Rates," March 2006 <http://www.kltprc.net/policynotes/pn0020_obesity_smoking.pdf>.

³⁹ Dr. James Cecil, Kentucky Cabinet for Health and Family Services, e-mail to the authors, 21 Feb. 2007.

⁴⁰ Telephone interview with Dr. James Cecil, Nov. 2006.

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Retiring Oral Health Advocate Assesses State's Status

Editor's Note: This summer, Kentucky's most visible advocate for oral health, Dr. Jim Cecil, will retire from his post with the Department of Public Health where he has worked under contract since 2001. On loan from the University of Kentucky (UK) where he has been a faculty member since 1996, Dr. Cecil is a public health dentist, an epidemiologist with a background in research and development. Recruited to help Kentucky rebuild its public health capabilities, Dr. Cecil has worked to raise public awareness of the state's oral health status and institute programs to moderate the ill effects of poor oral health. A retired Navy epidemiologist, Dr. Cecil is a native Kentuckian from Pewee Valley and a graduate of the UK College of Dentistry and Bellarmine University. He plans to work part-time with the UK College of Public Health to develop a new maternal-child health program.

What do you see as the major issues confronting the state in regard to oral health?

Dr. Cecil: The biggest one I see . . . is access to care, either preventive care or restorative care. During the 1980s, Kentucky, like a lot of other states, most other states, lost a lot of public health funding . . . Trying to build that back is almost impossible. Now there's another proposed round of federal cuts going to the public health sector . . . In the past 10 years, Congress re-upped much of those programs, but they're flat, so we're working with 1990 dollars, with a 2007 problem.

There's associated problems too with 2,200 dentists in Kentucky and only about 1,000 who have contracts with Medicaid. Half our children in Kentucky are Medicaid eligible or KCHIP eligible or living at or just above the poverty level. So we've got 1,000 dentists who have contracts, but only about 500 actually see a significant number of patients, so that's really an access problem. When we the dentists, the American Academy of Pediatric Dentists, recommend that children see a dentist at one year of age, who's going to do that? It's not the dentist, because most general dentists won't see a child under age three or four, just because of behavioral problems, just because they don't know how to handle kids. Most dentists, I think, like to treat people who are compliant and not very sick.

Is the access issue really one of a lack of people having dental insurance?

Dr. Cecil: That's part of it. It's a multivariant kind of problem. About two and a half to three times the number of people who don't have medical insurance in this country—44 million people in the U.S.—so about 130 million or so don't have dental insurance. It's probably even worse in Kentucky because a lot of our small industries don't offer coverage. For instance, the University of Kentucky doesn't . . . pay for dental coverage. We offer a plan to ourselves, but we have to pay for it totally. A lot of companies, including the state, have some kind of a plan, but at least the one the state has right now, is not particularly attractive to me.

Our Kentucky Health Insurance Research Project survey found that more than half of respondents said they had dental insurance. Does that seem accurate?

Dr. Cecil: Some bad data . . . Oftentimes in surveys people tell you what they think you want to hear. I've done a lot of surveys in my life, but you have to be careful how you interpret those.



To your knowledge what's the quality of dental insurance in Kentucky?

Dr. Cecil: It's not very good, actually. We're one of those states that dental insurers really don't like to come to. Dental insurance is not really insurance; it's really a prepayment system. If you go in to get a crown you'll still have to pay 50 percent of the cost of that crown. Except for a couple of plans, the dental insurance market is not robust here.

How does Kentucky differ from other states in regard to oral health?

Dr. Cecil: Well, you have high unemployment, high poverty, and even with people on Medicaid in Kentucky, less than 30 percent use the dental benefit. They might overuse the medical benefit but they underuse the dental. Part of that is related to how people who live in the

Medicaid system relate to the future, I think; most people living in poverty don't think about the future. They don't plan for the future, they plan the day . . . and they're not worried about five years from now. The consequences of not taking care of teeth occur in the future, they don't occur at the moment. It's a slow process that takes a long time for people to either feel the pain or see the results of infection.

The rural environment is associated with poor dental health as well, for the same reasons: access to care, access to prevention, and reduced incomes. Again, their perspective of the world is a whole lot different from that of people who live in Lexington, Louisville, Frankfort, or other places.

Also, we not only have a shortage of dentists, we have a poor distribution of dentists. If you look at how dentists and dental workers are distributed throughout the state, look at Northern Kentucky,

Paducah, Owensboro, Louisville, Lexington, and that's where 80 percent of them work. So that leaves a big, open, rural, hard-to-get-to area.

The states around us, except for West Virginia, have pulled themselves up by the boot straps dentally, I think. Tennessee, for instance, has a safety net network, accessible to almost every county, as a result of a lawsuit against Medicaid by a social activist in North Carolina. They sued Medicaid . . . because they were not meeting their EPSDT (Early Periodic Screening, Diagnosis, and Treatment) goals, a child health component of Medicaid. The court found that they weren't meeting their goals, and the result was for, in perpetuity, the dental program in the state of Tennessee would get at least \$14 million a year to maintain the safety net clinics.

Is that state allocation matched?

Dr. Cecil: Yes, in Kentucky, it's a three-to-one match. I've made a proposal to do that over the next ten years. I think we can have the same system for just \$1.6 million a year. It's not a lot of money. Illinois did the same thing. They set up safety net clinics all over the state. Indiana raised their fees for dentists up to the market value, and, of course, their budget tripled. A lot more people were getting seen, though. Ohio has just recently done that, brought the fee up to market value. Our fees are at about the 5th to 25th percentile, which means that 95 to 75 percent of the fees are higher than what the Medicaid fee is. That's why they're so unattractive . . . to private practitioners.

Are dentists under the same kind of pressure that physicians are under, that is, to form groups to be more profitable?

Dr. Cecil: They are, but we've got counties that have one dentist or no dentist. Fulton County has no dentist at all. So UK has set up a safety net in that county. But dentists like practicing alone. There are some pressures to be more efficient, but dentists don't care about that. The research in the dental profession indicates that the way dentists practice . . . is because they identify a dollar figure that they want to hit per year, and that's their goal . . . not to see more patients. It's not to save the world, those kind of things. It's almost directly related to a figure that they're aiming for each year, and they structure their practice to do that, unlike physicians. Physicians do it differently. I know they do.

When I interview our dental students, our student dentists coming into the dental school, it's a totally different world. When I went to dental school, and you were asked why do you want to be a dentist, it was, "Oh, I like to help people . . . I like to work with my hands . . . I like to work alone," etc. Now they say, "I just want to be rich." All the aesthetic dentistry—polishing teeth, making teeth whiter—is appealing. And most of the time they say, "I don't want to see sick people." If you're dentally ill, you're sick, you're not well at all, so it's a whole different world. Dental education is changing that way too. We're changing to accommodate them.

What part of the market for dentists now is comprised of cosmetic dentistry?

Dr. Cecil: I have no idea, but a lot of us old guys think it's too much. I was talking to a dentist in Lexington who has been there for years, a good practitioner who teaches. He was just dismayed at people who come to associate with him. They want to make white teeth, they want to put on veneers, they want to do botox injections, which are legal.

We waste so much money in our health care system it's unbelievable. If we scrape that 30 percent we waste off the top and just dedicate it to getting care to people, we'd be much better off, even if we still have those problems inherent in a bureaucracy. I was in Navy medicine a long time, and there is some bureaucracy you have to deal with, but you know how to navigate through it. Most people don't know how to navigate through a fragmented, complex, almost incomprehensible system.

Why should policymakers care about the oral health of the people in Kentucky?

Dr. Cecil: Dental, oral health is a health issue, and it affects a lot of other health issues that confront us: heart disease, stroke, diabetes, obesity, preterm babies, on and on and on . . . One of these days, I hope that dentistry will be more involved, in a holistic kind of way, in preserving and insuring the health of our patients.

But it's also an economic development issue. [To illustrate] I'll tell you a story. There's an organization in Berea that's called New Opportunity School for Women. They teach women who are usually out of abusive relationships . . . give them tools to gain entry into the marketplace, usually in some entry-level job. Some years ago, the director got hold of me . . . and said they've got a real problem . . .

half of the women don't get jobs because of their teeth. So a couple of us dentists, faculty members, went down there, did some examinations, and provided an entrée for them to get health care or dental health care through the college. That's an economic development issue in my opinion.

It's a health issue, but maybe overriding that or even overburdening that is economic development . . . we suffer from having those kind of diseases. Kids can't learn so our dropout rate in high school is huge. Half of our kids in Kentucky have dental caries or decay.

Little bitty kids, two- to four-year-olds, almost half of them have some tooth decay. And they carry those diseases to the next stages of their lives.

In Kentucky we get three sets of teeth: our baby teeth, our permanent teeth, and then our plastic teeth—if we're lucky. Medicaid does a good job of taking teeth out, but we don't provide dentures for people who have lost all their teeth. And so that's why we're the most toothless state in the nation.

Does Medicaid try to preserve a tooth that's decayed?

Dr. Cecil: For children, yes, it's a nice benefit. For adults, no.

. . . we not only have a shortage of dentists, we have a poor distribution of dentists. If you look at Northern Kentucky, Paducah, Owensboro, Louisville, Lexington, that's where 80 percent of them work. So that leaves a big, open, rural, hard-to-get-to area.

What usually happens when an adult arrives in an emergency situation?

Dr. Cecil: If they're in pain, they're going to have the tooth extracted, rather than a root canal or something like that. So our culture, if you will, promotes poor oral health. My father, when I was a student dentist, had periodontal disease, and I said, "Dad you've got to do something about it." He did, he went and got all his teeth taken out. And it really just broke my heart because he had money, so it wasn't a money issue, but it was his culture. You know, his mom had dentures when she was 30, and his dad had dentures when he was 40, and all his brothers and sisters had dentures. It doesn't have to be that way, of course.

Teeth are important, not just for aesthetics and health, but I think there's some self-confidence that goes with being whole. There have been studies done where people have their teeth removed, and they go through a mourning process, a grieving process very much like people who lose their hands. It lasts a long time, and, of course, they have to go through all the stages of grief. You do that every time you lose a tooth. It's like losing a finger or a nose or an ear . . . so it's not as innocuous as we let ourselves believe over time.

But as we see from the Washington, D.C., story where a young boy died from an infection that started with a decaying tooth and went to his brain . . . society paid \$250,000 despite the fact that he died. So there's a tremendous loss—human loss, societal loss, and the family is just never going to be the same.

One wonders how many conditions like that are never publicized or talked about.

Dr. Cecil: Two years ago at UK we had four adults in the hospital on respirators because of oral problems. They all lived, but society's cost for that was huge.

In the case of a person with periodontal disease who smokes or uses tobacco, the mouth doesn't heal; you can't control the periodontal disease. Whatever is in tobacco keeps wounds from healing, so if you're a smoker and you cut your hand, it's going to take twice as long for that cut to heal. In the mouth it's even more difficult; it just never heals. So that infection doesn't hurt, you don't have a lot of pain sometimes, but it gets huge.

It's estimated that if a person with moderate periodontal disease had the amount of inflammation in the mouth on their palm, it would be about the same as having the palm red and oozing and pussy. So you're not talking about an insignificant amount of tissue damage that the body's trying to deal with, yet you add smoking on top of that, and you add the use of alcohol, non-nutritious diets. All these things that we are telling ourselves we need to do for general health relate to oral health as well. And you can't be healthy if you don't exercise. Exercise helps the mouth actually to keep the blood flowing and keep the tissues building. If you don't exercise, the blood pools . . . the body's connected to the mouth and the teeth; that's the problem.

So it's more than just a health problem or dental health problem; it's a total health problem. It's an economic development issue; it's a self-confidence issue. I think people that are successful in life have most of their teeth most of the time. Maybe George Washington was

an exception, but you read the accounts of his last two decades of life, he was miserable 100 percent of the time, and it related to his teeth. My understanding is he kept one of his teeth even though it was wobbly for all of his life just so he could say he wasn't totally without teeth. It probably aggravated his pain and infection.

How does a disproportionately poor state such as ours overcome the high cost of access to dental care?

Dr. Cecil: I think you can do it by being efficient, and dental practice in the

private sector is not very efficient. For instance, if we had more school-based health centers where you can deliver efficient care on site without worrying about transportation . . . The proposal I made to Congress was exactly that: set up safety nets throughout the state, attach those to hospitals because a lot of these people need hospital care because of their dental problems; have relationships with both the health departments and other institutions, as well as the universities; and spend some money, and I think you can do it. We've done it at UK. We've got three centers, in Hazard, Madisonville, and Morehead. They're almost self-sufficient after a couple to three years.

We built them with earmarks . . . earmarks fell this year so we're trying to save them, but they're working on special issues with oral health, like diabetes, preterm babies, heart disease, and how to create systems to treat those things. And I think the Medicaid system needs to inject oral health into some of these disease management programs. The one for preterm babies indicates or guides the pregnant mom, the second person they should see after they see their physician is a dentist and get their gums in good shape, get them going, create the environment where preterm babies are less likely. We're doing that, and so far the indicators are that, compared to women who don't go through prenatal care with dental care, the preterm baby rate is lower, not by a whole lot but it's lower. And that care is really cheap. A preterm baby costs \$100,000 the first year. If you spend \$400 on getting your gums fixed, the disparity is huge.

How do these clinics become self sufficient?

Dr. Cecil: By being efficient, by using Medicaid properly, and through the use of auxiliaries. In our state, Kentucky, we have what's called expanded duty, auxiliaries (dental assistants) who can do a lot of things that only dentists in other states can do . . . and nondentists are cheaper than dentists. They're specially trained; they have to go to about another year of school to do expanded duties, and they're recognized by the Board of Dentistry. So if you have everybody in the office, even a private office, working to make money or to have a revenue stream, instead of just the dentist, then you can become more and more self-sufficient. You also can buy in bigger bulk if you're a part of the safety net.

The states around us, except for West Virginia, have pulled themselves up by the boot straps dentally, I think. Tennessee has a safety net network, accessible to almost every county . . . I think we can have the same system for just \$1.6 million a year.

While I go examine kids and write an order . . . the hygienist can come behind me at a separate time and provide all the care and I don't have to be there. I don't have to supervise her directly. So that's a lot cheaper too. Her costs are about half what the dentist costs. If the dentist is the only one doing care, that's not efficient. That's how we run our general practice (at UK and UofL clinics). Private practice is very inefficient. The dentist is the only one doing the care and must be involved in everything.

What do these clinics look like?

Dr. Cecil: Let me describe the one in Hazard because it's actually a little more mature. UK has a Rural Health Center in Hazard. It's attached or right next door to the Appalachian Regional Hospital. In that center, they've got a UK family practice residency.... that trains residents, using the hospital and the facilities at that rural health center. About six years ago we got a grant from HRSA (Health Resources and Services Administration) to build a new building, and they put in six dental operating rooms, incorporating dentistry into medicine in a big way. So now they have 2.5 dentists, I think, and a couple hygienists, and some assistants. We're seeing a lot of patients that aren't being seen by the private sector, mostly Medicaid or uninsured.

Two years ago they got a donation of a mobile van which is worth about \$400,000, so they've attached that and use that for the school health programs. They take the van out to schools. They see really sick kids back in the clinic; routine kids they see to all that stuff, prevention as well as routine treatment, in the van. And so they're efficiently using their people. Dentists aren't in the van except when they're doing treatment. And they don't do sealants in the van; hygienists do sealants with portable chairs in the schools. When I mean self-sustained ability, you have to be a little innovative on how you use high-cost people for high-cost things and low-cost people for low-cost things. I think that's how you can maintain these safety nets over time.

Is this the New Zealand model?

Dr. Cecil: That's very controversial. For the last 50 years, New Zealand and Australia and Saskatchewan have used what they call dental nurses in the school setting, mostly women who are part of remote villages or tribes. They have gone to New Zealand for this training and come out of there treating only children, but they do fillings, simple extractions on baby teeth, a lot of prevention and health prevention . . . but the dentist who supervises them is 1,000 miles away. Now with telehealth, it's a lot easier to supervise. That's been suggested for some of our needs here in the United States, and it's actually being undertaken in Alaska.

Organized dentistry is pretty much against this, as you might expect. They think it takes care away from their private practitioners, but there aren't any practitioners who are going to fly around

Alaska in midwinter to treat poor kids, so at UK we're kind of straddling the fence right now.

But, politically, I don't see that happening very soon although the American Dental Association has come to a negotiated agreement with the Alaskan tribes, kind of a waiver. So I don't know how it's actually going to end . . . I think eventually we'll have that kind of practitioner. If we had that in Kentucky, we could do a lot of stuff. We could have dental clinics in most every school district because you'd only need one dentist to supervise a bunch of them . . . Physicians went through this earlier in our history when nurse practitioners came about . . . in the 1970s. They went through the same political mess that we're going through in dentistry. They lost eventually, nurse practitioners won, and they're accepted by most physicians as being very competent and very helpful in their practices. And they make money for them too.

Are there states that really understand what the problem is, that have made great progress by being innovative? Are there any exemplar states out there?

Dr. Cecil: Yes, I think Tennessee is one . . . They have a dental clinic available to almost every county, a regional setup, regional dental directors, as well as (public health) dentists at these places, so theoretically everybody has access.

I would say Ohio is next, and part but not all of Michigan. A few years ago, they . . . did an experiment. In the most rural part of the state they gave everybody the Delta Dental Card, looks just like the Delta Dental Card that somebody who worked for General Motors would get. And they paid the same rates as Delta Dental, but it was only for these 30 counties. As you might expect, a lot of kids got treated, the budget quadrupled, it almost went broke, and now they're trying to get out of it. But it worked. That's how you got the private sector involved, [by paying] a reasonable fee.

In our state and in most states, the overhead for dental practice is around 70 percent, which means that every time a patient misses an appointment, the dentist incurs some cost just by having to set up and be ready. With no patient paying . . . there's no reimbursement. That's not true for medicine. If you're a family practice physician, you can add one more ten-minute exam to your schedule for the day and you won't incur a lot of overhead cost. That's not true for dental practice.

Dental practice is a lot like a small hospital practice. Very high overheads, lots of equipment, lots of staff, and if you don't meet those overhead costs, you really run the risk of not being able to survive. So when the Medicaid fee is at the 25th percentile and your overhead is 70 percent, every time a [Medicaid] patient comes in and the Medicaid rate is paid, you're still not making your costs.

What's the average cost of a full set of dentures, and do we have any programs to help people offset that cost?



In Kentucky we get three sets of teeth: our baby teeth, our permanent teeth, and then our plastic teeth—if we are lucky.

Dr. Cecil: We do actually. The Kentucky Dental Association has a denture program, and dentists voluntarily provide that service. Sometimes it's free, sometimes it's \$200. The University of Kentucky has a denture program, and I think a full set of dentures is \$250. There's a limit on how many they will provide each year.

I think the university's fee schedule for a patient covered under their plan would probably pay \$1,400. That's the cost now. The plan would pay half of that and the person would pay the other half. But it's not cheap. If you go to a private practitioner in Lexington, not connected with the university, you're probably talking about \$2,000 to \$3,000.

What role does the Kentucky Dental Board play?

Dr. Cecil: Their mission is to protect the health and safety of Kentuckians from the evildoers . . . They do a good job in substance abuse, and Kentucky also has a good program for practitioners who are abusing different substances, from drugs to alcohol . . . But they mostly act on complaints, so if somebody has a bad experience with a dentist, then they'll hear about it, there'll be an investigation, and they will either reprimand the guys or take their license away. I think every year we lose 20 or so dentists . . . because of some action taken against their license.

One of the big issues is Medicaid fraud . . . It's not 100 percent of the dentists, it's not even 2 percent of the dentists, but the ones who are doing it are just egregious in how they collect fees . . . For example, there was a pediatric dentist who was making what we call "flippers," for babies, for kids that lose their front teeth too early because of accidents or their care. So he was making this device that clipped to the back baby teeth, it was on a wire, it was ugly, but the parents wanted it and he was charging Medicaid \$300 for each one of these and it takes about ten minutes to make. It's useless, it doesn't help, so it doesn't enhance the appearance, it doesn't keep space from being lost for permanent teeth, which is one of the reasons we make appliances for little bitty guys. This is just outright fraud.

What role does the Kentucky Dental Association play?

Dr. Cecil: Almost 80 percent of Kentucky's dentists belong to the KDA, which is unusually high for professional associations. Why is the participation so high? The KDA does lobby for dental issues involving their members and I believe do a commendable job in advocating for the underserved in this state. Since the KDA is the advocate for the private practicing dentists mostly, they attempt to provide support for politically acceptable issues.

If we were going to build a safety net infrastructure in our state, you have suggested that federally qualified clinics, community

health centers, and the health departments would be the logical providers.

Dr. Cecil: We don't have very many at all and only a handful of the ones we do have dental capability, so . . . I was hoping during this [presidential] administration we would get more federally qualified health centers and more community health centers because the dollars were there to do that. Communities just didn't take [the president] up on it.

It is a very cumbersome process. Actually, I sat on the review board in Washington. We saw, I would say, ten a year. And the ones that are successful are not in rural areas but in New York City, Los Angeles, Chicago . . . where there's more infrastructure already in the community.

I think dentists are going to have to be trained more as partners with physicians on the medical side of the house, so we treat patients collectively.

Isn't it ironic where the need is most acute we expect an infrastructure to be in place?

Dr. Cecil: We're always on the wrong end of the scale. We don't have a big black population or Hispanic; we're getting one, but one of the criticisms by the National Institute of Health and

HRSA (Health Resources Service and Administration), for instance, is that we don't have a minority population, so we don't create programs for minorities. Well, if you look at Appalachia, that's a minority. If you look at white poor people in western Kentucky, that's a minority. They need to change their definition of a minority as black, Hispanic, Asian, or people of color to one that includes impoverished folks in Appalachia and Western Kentucky.

Was there a pivotal time when the state changed policy directions or missed a key opportunity to improve oral health?

Dr. Cecil: I think most of us public healthers would look at the 1980s as . . . where we lost. Part of it was . . . because we were really confident that TB (tuberculosis) had been eradicated essentially, and small pox. Then we found out that TB was coming back in a different form, resistant to antibiotics. A lot of the infectious diseases now are making a reemergence.

What strategies should the state use to remedy the current poor status of oral health?

Dr. Cecil: It's funny because I think there is a strategy and this harkens back to an earlier time . . . when my argument was that we don't have a private sector out there in dentistry that's going to support the treatment needed, much less the preventive needs, and public health needs to be both of those until the private sector can take on that responsibility. And the private sector has not and probably cannot since the private sector

is based on demand for care and not need for care. So I think we have the need, and our position should be that the state will try to provide those services because nobody else will. I think . . . like AIDS . . . oral health is a public health problem, and our citizenry is not able to meet its goals and objectives to become successful.



What effects do you see the aging of the population having on oral health?

Dr. Cecil: That's a big issue. People are keeping their teeth longer, which means as they get older they're apt to have more and more oral health needs, and more and more of us are taking drugs that affect oral health negatively. I think we dentists like to treat the healthy adult in their early and middle years, but somebody has got to treat those elder folks. A colleague is trying to find money to do some trials in nursing homes and show staff how to take care of elders' teeth. Whether they're alert or not, if you let those infections get out of control, their heart disease goes wild, their diabetes becomes uncontrollable, so it's necessary to keep those structures healthy, even in old people. Taking their teeth out is not the answer, and that is an answer, but I don't think that is a humane way to treat our elders. I wouldn't want my mother to have to go through that at her age. So aging is going to be an issue, and we're not adapting as professionals to those changes. I don't see it happening. Education and curricular change are very slow, and it takes a long while to get a faculty to look at what's really going on.


Do you see the increased focus on cosmetic dentistry as encroaching on the availability of dentists over time?

Dr. Cecil: I do. Also, not only is the population aging, the dentists are aging. About half the dentists in Kentucky are 50 or better, and we're not replacing them. We have two dental schools, and I think about 30 graduates stayed in the state last year, and the rest of them left for various reasons. Some may come back, but if you're not replacing yourself, then chances are you're going to get further and further behind as the population grows.

Do you see issues just over the horizon that you think are going to pop up in the next five to ten years, maybe even further out, with respect to oral health trends, that we could do some things now to get our arms around these issues?

Dr. Cecil: I think dentists are going to have to be trained more as partners with physicians on the medical side of the house, so we treat patients collectively. Somebody who has periodontal disease and heart disease we ought to be treating with a heart-oral health kind of complex. I think we're going to find more and more of those diseases, particularly infectious diseases, that are related to the inflammation and infection in oral diseases, and we'd better be prepared for that. Physicians are not, dentists are not right now, even though I spend a lot of my time trying to get the message out to both sides. I gave a presentation the other day to pediatricians at UK, and they looked at me in dismay and said, "What are you talking about, just teeth?" And I said, "Well, let's look at the infection to oral cavity in kids and adults. Could you live in that mess if it were on your hand? Would you go see a doctor about it, would you go seek care for that?" The linkages between all the diseases and our training need to change to address those issues.

I think we're going to see some new emerging diseases, not just in oral cavity, but it's going to affect the oral cavity. For example, . . . viruses are making comebacks, and I think that we need to be aware of them. Pandemic flu is another one dentists are going to be involved with eventually. What do you do with people who are infected with pandemic influenza? You don't send them to the hospital because they're going to infect everybody in the hospital. One of my suggestions has been that, if we have an epidemic or pandemic, maybe we ought to send them to dentist offices because they're little hospitals and they can isolate people and see to their nutrition, they can provide medicines, surgery if needed and we won't infect a 200-

or 1,000-bed hospital. So we have to think a little more globally than we do now, than dentists do, about how we're situated. We're not solo practitioners any more because of the insults being made on our society all the time. Infectious diseases, terrorism, I think our role is going to change. 

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